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Fratricide: Fact or Friction?

By

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The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or Department of the Navy.

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　　Twentieth century warfare has been characterized by an ever-increasing reliance on technology with smarter and smarter weapon systems. Unfortunately, this technological aspect is a two-edged sword. One edge allows us to prosecute the enemy at further ranges, while the other puts our friendly forces in danger because of our lack of ability to discern friend from foe at these longer ranges. Consequently, cases of fratricide have trended to rise along with the advancement in technology.
　　At the doorstep of the twenty-first century, little has really changed. Therefore, the operational commander is further burdened into dealing with this ugly reality as he plans his campaign strategy. Furthermore, fratricide is an issue that must be addressed at all levels of war, and must also be addressed in a joint and combined context. This paper focuses on a synergistic four-pronged attack to prevent fratricide. These four pillars of fratricide prevention are doctrine, training, rules of engagement, and technology.
　　Until the Department of Defense collectively inculcates these four pillars of fratricide prevention into our doctrine and the way we fight and train, the onus is on the operational commander to ensure they are included in the development of his operational plans.

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Abstract of

FRATRICIDE: FACT OR FRICTION?

Twentieth century warfare has been characterized by an ever-increasing reliance on technology with smarter and smarter weapon systems. Unfortunately, this technological aspect is a two-edged sword. One edge allows us to prosecute the enemy at further ranges, while the other puts our friendly forces in danger because of our lack of ability to discern friend from foe at these longer ranges. Consequently, cases of fratricide have trended to rise along with the advancement of technology.

At the doorstep of the twenty-first century, little has really changed. Therefore, the operational commander is further burdened into dealing with this ugly reality as he plans his campaign strategy. Furthermore, fratricide is an issue that must be addressed at all levels of war, and must also be addressed in a joint and combined context, or we are doomed to more unnecessary friendly casualties. This paper focuses on a synergistic, four-pronged attack to prevent fratricide. These four pillars of fratricide prevention are doctrine, training, rules of engagement, and technology.

Until the Department of Defense collectively inculcates these four pillars of fratricide prevention into our doctrine and the way we fight and train, the onus is on the operational commander to ensure they are included in the development of his operational plans.

General "Stonewall" Jackson, a now infamous Confederate general, died on May 8, 1863 of Pneumonia as a result of wounds received during the battle of Chancellorsville. At that point, the Civil War had languished for two years without either side making any real progress toward their war objectives, when General Jackson was sent by General Robert E. Lee to attack the Union army's flank across the Rappahannock River near Chancellorsville, Virginia.

The attack worked beautifully, throwing two Union corps into total confusion. The Confederates, under Jackson's brilliant leadership, killed, wounded or captured thousands of Union troops. Jackson's march against the Union flank, generally noted by most historians as a military masterstroke, had made the victory possible, but Jackson was not satisfied. With the sun setting on that fateful evening, Jackson and his aides scouted ahead for any possible advantage. As they returned, a Confederate unit mistook them as a Union cavalry unit and opened fire, wounding Jackson in the process. He was quickly evacuated from the battlefield where his left arm was amputated. Just a few days later, General "Stonewall" Jackson was dead—accidentally killed by his own army.[1]

By this point in the war, Generals' Lee and Jackson had formed an audacious partnership of command, and were considered by many as the two most ingenious general officers in the war. After Jackson's death, however, General Lee, "worn and still grieving from the loss of his friend and partner, made mistakes and met a crushing defeat at Gettysburg, Pennsylvania."[2]

Since the battle of Gettysburg, historians have argued over what would have happened if General Jackson would have lived and continued at Lee's side. If the battle of Gettysburg had gone differently, then perhaps the outcome of the war may have also gone differently? Could this one act of fratricide have cost the Confederates the war?

Although historically, General Jackson was far from being the first case of fratricide, he is certainly one of the two most memorable cases of fratricide in the history of the United States. The other being, the two U. S. Army Black Hawk helicopters that were shot down by two U. S. Air Force F-15s over Iraq on April 14, 1994, in which 26 people lost their lives.

This latter incident implicates fratricide as more than just a service issue; it is rather a multi-service, joint and combined issue that the operational commander must deal with. Although the total eradication of fratricide incidents is unlikely, it is perhaps that mindset that has led us, as a whole, to do so little, in real terms, about the problem.

Having said that, what are the real causes or conditions that lead to incidents of fratricide? Most are attributed to the "fog" and "friction" of war[3], but the fact is, these rates are unacceptably too high. In the Gulf War, 35 of 146[4] friendly casualties or 24 percent were caused by fratricide. The facts of fratricide have not only necessitated, but have obligated that operational commanders ensure these surreal statistics go down in future hostilities.

Although exact percentage rates of fratricide casualties in our twentieth century wars is now impossible to quantify, the commonly held fratricide rate of two percent[5] is no longer the accepted norm. This is due largely in part to the intense scrutiny brought

about after the Gulf War. In fact, fratricide rates have tended to increase during this century, and have ranged between ten and twenty-four percent.[6]

Traditionally, the fratricide issue has been attacked from three different avenues: technology, training, and rules of engagement, with technology receiving the most attention. Regrettably, these attacks have been characteristically singular in nature, and have also typically omitted one major component. Doctrine, our underlying principles of combat employment, should become the fourth avenue of attack and then the whole problem must be attacked synergistically, not just piecemeal. These four areas of attacking the fratricide prevention problem—doctrine, training, rules of engagement, and technology form the foundation of what I call the four pillars of fratricide prevention.

There are basically four different types of fratricide: air-to-air, air-to-ground, ground-to-ground, and ground-to-air. To adequately address all four types of fratricide would require volumes of research and writing, and is beyond the scope of this paper. Therefore, I have concentrated my analysis on air-to-ground fratricide only.

Definition and Scope

So, what exactly is fratricide? The common definition is "the act of killing one's own brother", as in our first recorded case in the Bible when Cain killed Abel in the book of Genesis.[7] However, this definition does little to help the operational commander understand its relevance, complexity or impact on today's modern battlefield.

Conceivably, part of the underlying problem of fratricide is that there is no common definition of the term. Hard to believe, but Joint Pub 1-02, Department of Defense Dictionary of Military and Associated Terms,[8] does not even have a definition for

fratricide. In fact, only the army spells out a clear definition of fratricide—perhaps because they are usually the ones on the receiving end of these incidents. Their Army Field Manual 100-5 defines fratricide as "the employment of friendly weapons and munitions with the intent to kill the enemy or destroy his equipment or facilities, which results in unforeseen and unintentional death or injury to friendly personnel."[9]

To exacerbate this problem, not only is there a problem in a common definition, there is also a huge problem in fratricide calculation. There are currently at least three different ways to calculate fratricide rates. Unfortunately, our three largest joint training centers all use different methods of fratricide calculation, and the three are not directly comparable. "Often the methods are intermixed or used interchangeably with no clear notation of method, further complicating a problem that is inherently difficult to understand."[10]

The first method is used by the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana, and is considered the traditional formula for fratricide calculation. It is calculated by dividing the total number of friendly casualties by the number of friendly casualties caused by friendly fire; or represented graphically:

$$\frac{\text{Number of friendly troop casualties caused by friendly fire}}{\text{Total number of friendly casualties}}$$

This number is expressed as a percentage, as in 24% in the Gulf War as mentioned earlier.

The second method of calculation is used by the National Training Center (NTC) at Fort Irwin, California. It is calculated by dividing the number of friendly troop casualties

caused by friendly fire by the total number of enemy casualties inflicted; or represented graphically:

$$\frac{\text{Number of friendly troop casualties caused by friendly fire}}{\text{Total number of enemy casualties inflicted}}$$

This number is also expressed as a percentage, but obtaining an accurate count of enemy casualties in war is next to impossible, making it a less desirable option in my opinion.

The third method is used by the Combat Maneuver Training Center (CMTC) in Hohenfels, Germany, and uses a raw number with no denominator to express fratricide rates. This number stands out because one does not have to wonder about "a percentage of what?"

My only intent in showing these three starkly different methods of calculation is to graphically depict that we truly are talking about "apples and oranges" with the different methods, and the inherent confusion that brings. Further, any discussion concerning fratricide rates or percentages must include the method of calculation.[11]

Doctrine

Doctrine, simply stated, is the "how" portion of combat employment. Modern warfare advances have allowed us to prosecute the enemy at farther and farther distances, and with the increased range and lethality, the risk of fratricide is exponentially increased. "If in fact the characteristics of modern warfare are increasing the fratricide risk, then doctrine must be considered vital in any program to manage the problem."[12]

The exorbitantly high rate of fratricide in the Gulf War mandated the momentum for change in doctrine's role, but the change has been anything but swift and complete. One

extremely important change to joint doctrine did arise as a result of the Gulf War, however. As stated in Joint Pub 3-0, Doctrine for Joint Operations:

> "Prevention of fratricide. JFCs make every effort to reduce the potential for fratricide—the unintentional killing or wounding of friendly personnel by friendly fire. The destructive power and range of modern weapons, coupled with the high intensity and rapid tempo of modern combat, increase the potential for fratricide. Commanders must be aware of those situations that increase the risk of fratricide and institute appropriate preventive measures."[13]

One must wonder, however, just how much of this doctrinal change to operations is mere "lip service?" There seems to be more talk about changes, then actual changes to the real way we do business. Professional military education courses at all levels discuss the Commander's Estimate of the Situation (CES) in great detail, but oddly there is no mention of the commander's role in fratricide prevention. From what I understand, the CES is the most important planning document for operational commanders, and at levels directly above and below him, yet there is no mention of fratricide. The sample decision matrix[14] is replete with references to the "principles of war" and the like, but again, nothing on fratricide?[15]

Sound doctrine is yet one tool in the operational commanders bag that can help him walk the thin line between our own capabilities and vulnerabilities to that of the enemy as he oversees the planning and direction of his operational objectives. "The principles of war demand boldness and audacity—seemingly counter to the protective caution necessary to prevent fratricide. Helping in this dilemma, doctrine assists the commander by providing proven risk management tools and guidance."[16]

One pivotal doctrinal change is the role of the Joint Force Air Component Commander (JFACC). By applying our time tested doctrine of "centralized control and decentralized execution," the JFACC can develop an integrated plan for the use of all air assets, thus

ensuring everyone knows exactly where each of these air assets are located and what they are doing. Yet again, there is much debate over the utility and need for the JFACC. Unfortunately, these are typically parochial views that do not comprehend the synergy provided by a single integrated air campaign. If the two Black Hawk helicopters mentioned earlier would have been on the Air Tasking Order (ATO) on April 14, 1994, there is a great likelihood that they would not have been shot down in my opinion?

The army and the air force are the two services with the most on the line when it comes to air-to-ground fratricide. Unfortunately, the army has historically been on the receiving end while the air force has been on administering end. "Neither service to date has a single publication that fully addresses fratricide reduction."[17] Currently, air force doctrine addresses the reduction of air-to-ground fratricide at all levels from tactical through operational. The army's main doctrinal push for the reduction of air-to-ground fratricide is principally centered on their tactics, techniques and procedures employed below the battalion level. At the same time, the combat training centers (NTC, JRTC and CMTC) have in essence, developed their own doctrine based primarily on observations, recent combat operations and trends noted at the centers themselves.

While doctrine plays a key role in fratricide prevention, it, like rules of engagement, technology, and training is only one pillar of four that must be employed synergistically, if we are to come up with a solution to an extremely complicated problem. There are also many unresolved service and joint doctrinal issues that have a huge impact on fratricide implications. Other than the JFACC issue mentioned earlier, there is an ongoing struggle between the services for control of the "deep battle"--not only how it is defined, but who owns it, once it is defined. While these are complex issues that won't be resolved any

time soon, until they are solved at higher levels, the operational commander is the one who is stuck with the burden of how to handle them in a war time environment.

Training

Other than technology, training seems to shoulder most of the fratricide prevention emphasis currently. In fact, it is almost hard to imagine more emphasis being added in current and combined and joint training environments. However, like the doctrinal issue, it appears to be little more than glossy lip service in most cases. It takes more than commanders standing up and saying at the beginning of a large scale exercise, "OK men, let's have a great exercise, work hard, destroy your enemy, and ...oh yea, let's not have any fratricide."[18]

More than any of the other three pillars of fratricide prevention, training addresses the human element of fratricide. Perhaps the single greatest legacy of the Gulf War, other than the primacy of air power, is the focus it placed on the importance of rigorous, realistic training as a means of reducing friendly fire. Training is especially important in developing fire discipline, realistic exercise planning and coordination functions and building confidence in supporting units and weapon systems.[19]

In the air-to-ground environment, the most dangerous element of combat is in the arena of Close Air Support (CAS). CAS in the Gulf War is said to be one of the true success stories of training. "Realizing the friendly fire potential in the Gulf War, coalition air and ground forces took part in an unprecedented in-theater training program in the six months prior to the shooting. In fact, fifty-seven percent of all A-10 sorties

were flown before the hostilities began."[20] Many feel that due in large part to this effort; there was only one case of fratricide in the CAS arena. However, one has to question the significance of this event for a war in which we had six months to plan and prepare for, in theater no less; and for a ground war that lasted for only one hundred hours? Is this the standard by which we can gage a future protracted war--I hardly think so.

The army, for obvious reasons, has taken the most aggressive and proactive role in training to prevent fratricide in future wars. After extensive study of the Gulf War lessons learned, the army has expanded anti-fratricide training into a good portion of their leadership development programs and mission scenario simulations. These programs are part of the military training centers and are quite comprehensive in nature.

As part of our doctrinal changes, these training scenarios at the major military training centers are becoming more and more joint, and some have even taken on a combined flavor with large foreign participation. With the current and future emphasis on expeditionary warfare, these joint and combined training opportunities, will more than likely, continue to increase in the future.

One disturbing trend in the air-to-ground arena, is the fact that the air force has moved to make Air Liaison Officers (ALO) an enlisted billet called an Enlisted Terminal Attack Controller (ETAC). Historically, ALOs were all flight officers with fighter backgrounds--either fighter pilots or fighter Electronic Warfare Officers. That practice changed about five years ago when officers with bomber backgrounds were made ALOs, as a result of a shortage of fighter qualified officers to fill those ALO positions. As shortages developed in the bomber community, regular officers with no flying background were made ALOs. Now we have come full circle with very junior enlisted personnel, with absolutely no

flying background, being made ETACs to control fighter aircraft in the CAS role. This is clearly a two-edged sword; yes we have filled the ALO positions the army so desperately wants and needs, but we have given them a junior enlisted man with zero experience in fighter operations.[21] Only time will tell what kind of impact this may have on future combat operations.

The operational commander has to take the lead for large scale training exercises to be effective. However, he must not be afraid of fratricide because timidity can take away our advantages in other areas. He must strive to manage it through a perfect blend of tough, realistic, combined arms training. His standards must be communicated at all levels to ensure compliance. while at the same time not thwarting the boldness and audacity needed to ensure victory. It is this fine line, that the operational commander must know and communicate beyond a shadow of a doubt in both the training and combat environments.

Rules of Engagement

The most restrictive pillar of fratricide prevention is the rules of engagement. Basically, the rules of engagement tell us when we can and cannot "pull the trigger" on a weapon system. Joint Pub 1-02. Department of Defense Dictionary of Military and Associated Terms defines rules of engagement as:

"Directives issued by competent military authority which delineate the circumstances and limitations under which the United States forces will initiate and/or continue combat engagement with other forces encountered. Also called ROE."[22]

Although ROE are made up of three different elements: international law, political limitations, and military limitations, I will concentrate my emphasis on the military

portion of these. "From the military standpoint, ROE must provide the framework for operators to meet the military objective, as well as enforce political policy and comply with international law."[23]

On the military leadership side, operational commanders may impose greater restrictions on ROE to that given by the National Command Authority, but not less restrictive. Operational commanders may choose to restrict these ROE to prevent an escalation of a conflict or to ensure the timing of certain campaigns. The best example that would apply to this scenario would be limiting "shooting" engagements until sufficient troops have arrived in theater to carry out the commander's gameplan. The bottom line is that the operational commander must ensure ROE are based on operational objectives with consideration to assets available for employment.

The fine line the operational commander must walk is how ROE can directly effect mission effectiveness. If the ROE is too restrictive, mission effectiveness will surely go down since fewer targets can be effectively engaged, but on the other hand, the likelihood of fratricide will also go down. Conversely, if the ROE is too permissive, fratricide rates will go up proportionally to those restrictions. The true dilemma for the operational commander is to have absolutely the most effective ROE that creates the greatest amount of mission effectiveness.

One aspect of ROE is the ability to identify the enemy through a visual means or Visual Identification (VID). To many, VID is the most reliable form of identification, but the major drawback to the VID scenario is that you must put yourself in the enemy's weapons envelope to make that positive identification. This problem is exacerbated by the fact that many of our enemies weapon systems look exactly like ours, or worse yet,

are the same as ours. As in the case of the Black Hawk shootdown over Iraq, the HH-60 helicopters were misidentified as Russian built "Hind" helicopters.

ROE is perhaps the toughest fratricide prevention pillar to quantify because of its direct relationship to mission effectiveness. One would certainly hate to think we are setting ourselves up as an "easy kill" by the enemy, when all we are really trying to do is to keep from killing ourselves. It is up to the operational commander to identify and articulate that fine line in the development of his ROE.

Technology

America is a very technologically based society, and whenever difficulties occur, our "quick-fix" mentality pushes us toward technology as the solution. Reducing or eliminating fratricide is no different--if we throw enough money at a particular problem, it should just go away. Unfortunately, fratricide has too many variables, for technology alone to fix the problem. However, of the four pillars of fratricide prevention, technology can have the largest single impact, and is the single area that has received the most attention over the last ten years.

Since the end of the Gulf War, when fratricide came to the forefront of the American conscious via the "CNN effect", the army and air force were given the lead to develop new technology based solutions to eliminate or at least decrease fratricide. The overwhelming majority of these technological devices have been aimed at the problem of combat identification through the use of Identify Friend or Foe (IFF) type systems. The air force has used IFF systems for decades to assist aircrews in determining the good

guys from the enemy. Consequently, there were no cases of air-to-air fratricide during the Gulf War, mainly as a result of the IFF system and the role of the JFACC.

The other area that has received a great deal of attention has been in technological devices that are intended to increase situational awareness. "Situational awareness is the knowledge of your own location, the location of other friendlies, the location of the enemy, and the location of neutrals/non-combatants."[24] One such system designed to capitalize on both the IFF system and an increase in situational awareness is known as the Battlefield Combat Identification System (BCIS). The BCIS program was initiated shortly after the end of the Gulf War as part of the army's Combat Identification Program. During the Gulf War, the lack of situational awareness and the lack of ability to correctly perform target identification were involved in more fratricide cases than any other cause.[25]

The basic premise behind the BCIS system is the use of a millimeter wave and transponder receiver system integrated into current laser systems used by armor crewmen. The "wave" sent by the interrogator looks for platforms that are equipped with a receiver to match that system, which is then sent back to the interrogator as a radio frequency response to tell the crewmen whether they are interrogating a good guy or a bad guy. Currently, an enhanced version of BCIS with digital datalink for improved situational awareness and various air-to-ground concepts, including direct sensing target identification is being developed. The probability of correct identification is said to be 99 percent out to an effective range of 1.5 times the effective range of the weapon, and correct identification of position location within 100 meters.[26]

Other technological devices being researched concentrate on satellites and radios to identify both location and combat identification. The United States Navy is working on a new location system combining satellite and radio links to provide battlefield plotting while also giving friendly force identification to attacking platforms. Consequently, users can access the system's full capabilities via a laptop computer, and position identification hardware can be easily assembled into a backpack type configuration for Special Forces.

This system is known a the Situation Awareness Beacon with Reply (SABER), and allows tactical level commanders and ship and airborne commanders to locate and identify friendly forces. The user can opt for either a line-of-sight connectivity or a satellite communications links enabling over-the-horizon operations.[27] A key component to this system is that it allows for operational level commanders to know the exact location of forces on the battlefield in real time, as they respond to enemy maneuvers.

Aircraft working in the air-to-ground role can also query units on the ground below to determine if there are friendly forces in the vicinity of their target area. Data from this system can also be merged with other current situational awareness platforms in use by the army. One key element to this system is that it offers information that is two-way which allows the commander to tailor the position query rate to support operational needs.

A typical scenario in the air-to-ground environment would be an Air Force F-16 or A-10 preparing to attack a particular target. The fighter aircraft equipped with SABER and GPS capability would transmit an "intent to shoot" message that informs ground based SABER units of the impending air strike in the area. This message informs

friendly SABER equipped forces with the intent to attack, the time of attack, and the aimpoint of the fighter aircraft. The SABER systems in the target area determine if they are in the fragmentation pattern of the munitions to be employed, and if so, transmits an immediate "don't shoot me" message.[28]

Technology offers many advantages that the other fratricide reduction pillars can not offer, but again, used in only isolation, technology can still be overcome by human intervention or system malfunction. Furthermore, technology can also be overcome by more advanced technology that forces us to rely on other pillars of fratricide prevention.

Conclusion

Fratricide has literally been around since the genesis of mankind, but not until the last ten years has fratricide become a household word--if not by word, then at least by concept. The media has played a large role in pushing this recent explosion of fratricide awareness into our collective consciousness, but only because they bring us an almost real-time account of battlefield operations into our living rooms.

The two most publicized fratricide events in American history were the Gulf War, where 24 percent of American casualties were attributed to fratricide, and the Black Hawk shoot down following the Gulf War where 26 people were killed. These two events have been the sole impetus for a resurgent interest in fratricide prevention. Regardless of the reason, however, fratricide prevention may be the operational commander's biggest challenge on the battlefield in future hostilities.

I am not naïve enough to think that a single fratricide incident may change the outcome of a war, quite possibly like it did with General "Stonewall" Jackson, but one

must remember what our strategic center of gravity is: the will of the people. The will of the people certainly spoke in Vietnam. Imagine an ongoing war where we are up to 10,000 casualties and 2,400 (24 percent just like the Gulf War) were caused by our own troops. I don't think it would take too long for the American public to speak, and put an end to the hostilities?

Although the "fog" and "friction" of war will never be totally eliminated, their effects can be certainly minimized by concentrating on these four pillars of fratricide prevention: doctrine, training, rules of engagement, and technology. None of these pillars can prevent fratricide in isolation, however; there must be a synergistic study and application of the four. The fact is fratricide is a joint and combined problem that must be addressed at all levels in order to reduce or eliminate their drastic consequences.

Notes

[1] "Friendly Fire that Changed a War." <http://www.dtic.mil/afps/news/9902028.htm>
        (13 April 1999) p. 1.

[2] Ibid.

[3] "Fog" and "Friction" of war are two classic Clausewitzian terms and concepts used in his book, On War

[4] Burgess, Roy W. "Friendly Fire." <http://www.freemason.org/scrl/monthly/frndfire.
        htm> (13 March 1999) p.1.

[5] A study done in 1982 by Lieutenant Colonel Charles R. Schrader entitled Amicide: The Problem
        of Friendly Fire in Modern War became the definitive study on the subject of fratricide rates
        in the American military in the 20th century. Lt Col Schrader concluded that the average rate of
        fratricide in these wars was approximately two percent. A more recent study done by TRADOC
        in 1994 has shown these figures to be low; with the real average being around 15 percent.

[6] Larsen III, Henry S. "Fratricide: Reducing the Friction trough Technology." School of
        Advanced Military Studies, Unite States Army Command and General Staff
        College, Fort Leavenworth, KS 1995 p. 7.

[7] Genesis 4:8.

[8] Joint Pub, 1-02, Department of Defense, Dictionary of Military and Associated Terms
        Washington D.C. 10 June 1998.

[9] Headquarters Department of the Army, FM 100-5 Operations. Washington: 1993 p. 2-11.

[10] Steinweg, Kenneth K. "Dealing Realistically with Fratricide." <http://carlisle-www.army
        Mil.usawc/parameters/1995/steinway.htm> (13 April 1999) p.2.

[11] Ibid. Taken from lengthy discussion in his paper and synopsized.

[12] Bundy, Gary J. "Not So Friendly Fire." Unpublished Research Paper, U.S. Naval War
        College, Newport RI: 1994 p. 18.

[13] Joint Pub 3-0 partial quote taken from p. IV-7.

[14] Taken from Joint Military Operations Course Reading NWC 4111C (Commander's Estimate
        of the Situation).

[15] Waterman, Danny L. "Fratricide: Incorporating DESSERT STORM Lessons Learned."
        Unpublished Research Paper, U.S. Naval War College, Newport RI: 1998 p. 11.

[16] Bundy, Gary J. "Not So Friendly Fire." Unpublished Research Paper, U.S. Naval War
        College, Newport RI: 1994 p. 18.

[17] Owskey, Thomas C. "Fratricide: The Result of Undisciplined Aggressiveness." U.S.
        Army War College, Carlisle Barracks, PA: 1996 p. 19.

16 Not taken from any real quote. Just my perception on how a operational commander might come across
        in delivering pre-exercise speech.

[19] Bundy p.20

[20] Ibid p.20

[21] Note: there still are actual ALOs officers out there, just much fewer than we would like.

[22] Joint Pub, 1-02, Department of Defense, Dictionary of Military and Associated Terms
        Washington D.C. 10 June 1998. p. 388

[23] Tinsley, Thomas L. "Balancing ROE with Mission Effectiveness." Unpublished
        Research Paper, U.S. Naval War College, Newport RI:1998 p. 7.

[24] Waterman, Danny L. "Fratricide: Incorporating DESSERT STORM Lessons Learned."
        Unpublished Research Paper, U.S. Naval War College, Newport RI: 1998 p. 7.

[25] Ibid p.18

[26] "Battlefield Combat Identification System Briefing"
        <http://www.sarda.army.mil/searchmain.htm> (1 May 1999) p. 2.

[27] Ackerman, Robert K. "Satellites, Radios Combine for Location, Identification."
        Signal Magazine <http://www.us.net/signal/Archive/Dec96/Satellites-dec.
        html> (23 March 1999) p.1.

[28] Ibid p. 3.

Bibliography

Ackerman, Robert K. "Satellites, Radios Combine for Location, Identification." Signal Magazine <http://www.us.net/signal/Archive/Dec96/Satellites-dec. html> (23 March 1999).

"Air Force Material Command." <http://www.af.mil.cgi-bin/multigate/ retrieve?u=z3950r://dtics11:1024/airforce!F2935%.htm> (26 March 1999).

Army and Marine Corps Integration in Joint Operations Multi-Command Pamphlet 303.8 May 1996.

"Battlefield Combat Identification System Briefing" <http://www.sarda.army.mil/searchmain.htm> (1 May 1999).

Bryan, C.D.B. Friendly Fire. New York: G P Putnam's Sons 1976.

Bundy, Gary J. "Not So Friendly Fire." Unpublished Research Paper, U.S. Naval War College, Newport RI: 1994.

Burgess, Roy W. "Friendly Fire." <http://www.freemason.org/scrl/monthly/frndfire. htm> (13 March 1999).

Center for Army Lessons Learned. Fratricide Risk Assessment for Company Leadership. Fort Leavenworth, KS, 1992.

Clausewitz, Carl von On War, edited and translated. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press) 1984.

Concept for Future Joint Operations Expanding Joint Vision 2010 May 1997

"Contracts Focus on Research to Reduce 'Friendly Fire' Incidents." <http://www.af.mil/ cgi-bin/multigate/retrieve?u=3950r://dtics11:1024/news!F5488%3a9.htm> (24 March 1999).

"Fratricide Causes and Effects." <http://call.army.mil/call/handbook/92-3/92-3sl.htm> (26 March 1999).

"Friendly Fire that Changed a War." <http://www.dtic.mil/afps/news/9902028.htm> (13 April 1999).

Garamone, Jim "Fixes Touted to Combat Friendly Fire Casualties." <http://www.dtic. Mil/afps/news/9902027.html> (22 April 1999).

Garrett, William B. III. "Fratricide: Doctrine's Role in Reducing Friendly Fire."
Unpublished Research Paper, School of Advanced Military Studies, United States
Army Command and General Staff College, Fort Leavenworth, KS: 1993.

Headquarters Department of the Army, FM 100-5 Operations. Washington: 1993

Joint Doctrine Encyclopedia. Joint Doctrine for Military Operations other than War
(Joint Pub 3-07) Washington D.C. 1998

Joint Pub, 1-02, Department of Defense, Dictionary of Military and Associated Terms
Washington D.C. 10 June 1998.

Larsen III, Henry S. "Fratricide: Reducing the Friction trough Technology." School of
Advanced Military Studies, Unite States Army Command and General Staff
College, Fort Leavenworth, KS 1995.

Maheras, Russ "ETACs Pave Way for Close Air Support." <http://www.af.mil/cgi-bin
/multigate/retrieve?u=z3950r://dtics11:1024/news!F5086%3a9.htm>
(24 March 1999).

Masko, David P. "Black Hawk Questions Linger." <http://www.af.mil/cgi-bin/
Multigate/retrieve?u=z3950r://dtics11:1024/news!F2838%3a9.htm>
(24 March 1999).

O'Connor, Michael P. "Fratricide: A preventable Technological Disease." Unpublished
Research Paper, U.S. Army War College, Carlisle Barracks, PA: 1992.

"Operational Risk Assessment and Management: An Overview." <http://call.army.
mil/call/newsltrs/92-4/appena.htm> (23 March 1999).

Owskey, Thomas C. "Fratricide: The Result of Undisciplined Aggressiveness." U.S.
Army War College, Carlisle Barracks, PA: 1996.

Singer, Jeremy "Radar Malfunction Increases Fratricide Risk for U.S. Forces in
Balkans." <http://ebird.dtic.mil/Apr1999/e119990419concat.htm> (19 April
1999).

Steinweg, Kenneth K. "Dealing Realistically with Fratricide." <http://carlisle-www.army
Mil.usawc/parameters/1995/steinway.htm> (13 April 1999).

"The Art of Warfare Fratricide." <http://mprofaca.cro.net/fratricide.html>
(26 March 1999).

Tinsley, Thomas L. "Balancing ROE with Mission Effectiveness." Unpublished
Research Paper, U.S. Naval War College, Newport RI:1998.

U.S. General Accounting Office. <u>OPERATION PROVIDE COMFORT: Review of U.S. Air Force Investigation of Black Hawk Fratricide Incident.</u> Report to Congress. Washington: 1997.

Waterman, Danny L. "Fratricide: Incorportating DESSERT STORM Lessons Learned." Unpublished Research Paper, U.S. Naval War College, Newport RI: 1998.

Wild, Douglas A. "Fratricide and the Operational Commander: An Appraisal of Losses to Friendly Fire." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998.